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STAFF RECOMMENDATION

ON CONSISTENCY DETERMINATION

Consistency Determination No.	**CD-053-04**
Staff:	MPD-SF
File Date:	7/16/2004
60th Day:	9/14/2004
75th Day:	9/29/2004
Extended to:	10/15/2004
Commission Meeting:	10/14/2004

FEDERAL AGENCY: **U.S. Army Corps of Engineers**

PROJECT LOCATION: Matilija Dam, Los Padres National Forest, west of Maricopa Hwy. (Rte. 33), 16 miles from the shoreline, Ventura County (Exhibits 1-4)

PROJECT DESCRIPTION: Removal of Matilija Dam (Exhibits 5-10)

SUBSTANTIVE FILE DOCUMENTS: See page 32.

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers ("Corps") is proposing to remove Matilija Dam, a concrete arch dam located 16 miles inland of the shoreline on Matilija Creek, a tributary of the Ventura River in Ventura County. Built in the late 1940s, the 190 ft. high dam blocks steelhead trout migration and sand supply to the coast. Less than 10% of storage capacity remains in the dam, which is rapidly filling with sediment, thus limiting its effectiveness as either a flood control or water supply facility. The approximately 6 million cubic yards of sediment that have accumulated behind the dam since its construction would be removed and strategically placed in the river's flood plain, and ultimately transported to the shoreline through natural storm

conveyance. Over time, the Creek would be restored and returned to its natural pre-dam streambed configuration.

Overall, the project's goals of improving terrestrial and aquatic habitat, removing a major barrier to fish passage, facilitating the migration, spawning, and rearing of southern steelhead (an endangered species), and restoring the natural sediment transport regime of Matilija Creek and the Ventura River, would be consistent with Coastal Act goals for habitat restoration and beach enhancement. The project would also improve public access and recreational fishing, both inland and at the shoreline (through the beach enhancement component). The project has the potential for temporary adverse effects on a number of coastal resources; the Corps is addressing these impacts through mitigation measures designed to protect habitat, reduce risks from flooding, protect existing vital water supplies for the region, minimize water quality impacts, and protect archaeological resources (Exhibit 24). In addition, this being the largest dam removal project in the United States to date, the Corps realizes there are a number of uncertainties in mitigating impacts and in predicting creek and river system responses to the proposal. Therefore, the Corps proposes a monitoring and adaptive management plan to respond to these uncertainties (Exhibit 25).

Because a number of the mitigation measures, the adaptive management plan, and the dam removal project itself, have not been fully designed at this time, the Corps has agreed to a "phased" consistency review (see p. 6). With the mitigation measures and the opportunity for future Commission review of subsequent mitigation and monitoring plans and design plans, and given the information available to date, the project is the least damaging feasible alternative and is consistent with the habitat and stream protection (Sections 30230, 30233 and 30240), recreational fishing (Sections 20234 and 30234.5), water quality (Sections 30231 and 30232), sand supply (Sections 30233(b) and (d)), public access and recreation (Sections 30210-30220), geologic hazards (Section 30253), and archaeological resource (Section 30244) protection policies of the Coastal Act. Through enhancing downstream beach building, the project would also lessen the region's need for construction of shoreline protective devices.

I. STAFF SUMMARY AND RECOMMENDATION:

A. Project Description. The Corps has submitted a consistency determination for the removal of Matilija Dam inland of the coastal zone on Matilija Creek, a tributary of the Ventura River in Ventura County. The Matilija Dam is a concrete arch dam (Exhibit 6) located about 16 miles from the Pacific Ocean and just over half a mile from the Matilija Creek confluence with the Ventura River (Exhibits 1-4). Sediment that has accumulated behind the dam since its construction in the late 1940s (Exhibit 5) would be removed or re-configured to improve the Matilija Creek flow regime and ultimately restore Matilija Creek to a more natural pre-dam streambed configuration. The project is intended to improve terrestrial and aquatic habitat conditions along Matilija Creek and the Ventura River for the benefit of fish and wildlife species. Removal of the dam would both: (1) eliminate a barrier to fish passage on Matilija Creek and facilitate migration, spawning, and rearing of southern steelhead, an

endangered species; and (2) restore the natural sediment transport regime of Matilija Creek and the Ventura River, thereby improving downstream coastal beach sand replenishment. The proposal would also include placing the sediments that have accumulated behind the dam within the floodplain such that they could also ultimately contribute to beach building, as well as public access and recreation improvements.

The project includes the following features:

Site Preparation activities include stripping the perimeter of the reservoir area, delta and upstream sites of most of the existing vegetation, particularly the large stands of giant reed (*Arundo donax*), along with other native vegetation that is intertwined in the giant reed. One stand of oak trees that has not been subject to significant amounts of sediment deposition will be protected in place.

Removal of 'Reservoir Area' Sediments will consist of slurrying approximately 2.1 million cubic yards of mostly silt), underlying the existing lake behind Matilija Dam, to a designated downstream disposal site. The sediment will be combined with Lake Casitas water, screened for coarse material and thickened prior to pumping, and then transported by pipeline to disposal areas located downstream. This activity will include relocating sensitive species such as the California red-legged frog and the southwestern pond turtle, and an eradication program for bullfrogs, crayfish and green sunfish.

The slurried materials will be deposited within several areas in proximity of the Highway 150 (Baldwin Road) Bridge. The areas, comprising 118 acres in the floodplain, are both upstream and downstream of the bridge and are located 3.6 to 6.3 miles downstream of Matilija Dam. The locations of the slurry disposal areas are shown in Exhibits 10 & 12-15. The thickness of placement will vary by area and range between 10 and 25 feet. Earthen (sand and gravel) containment dikes will be constructed to contain the slurried materials. Containment dike heights will range between 10-30 ft., with an average of approximately 20 feet. The areas to be diked will be cleared of vegetation to enhance percolation. Water collection systems, settlement ponds, observation and pumping wells, may also be added.

The upstream-most slurry disposal site will have riprap stone protection. The three other disposal areas, located mostly on low floodplain terraces and subject to less frequent flows, will have less extensive stone protection. Willows may also be planted on the side slopes to provide soil stabilization during larger storm events. Once the slurried materials are sufficiently dewatered, the disposal areas can be revegetated using native plants.

Management of 'Delta' and 'Upstream Channel' Area Sediments, which will take place while the slurry operation is taking place, will involve excavating a 100 ft. wide channel (in an alignment similar to the pre-dam channel) and including removing 1.1 million cubic yards of sediment, to be temporarily placed in several storage sites upstream of the dam (Exhibit 11). The excavated channel will be designed to allow for a smaller meandering channel to naturally

develop in the channel bottom between storm events. Channel side slopes will be of 3H:1V in slope. Sediments within the original reservoir basin will be subject to natural erosion and transport downstream by stream flows. Selective segments of the channel within the lower half of the reservoir basin will be protected with soil cement revetment. The purpose of the revetment is to "meter" the erosion of the finer-grained, 'Delta Area' sediments whenever the revetment is overtopped by larger flows. The revetment height has been designed to be overtopped by flows exceeding a 10- year storm event (12,500 ft^3/sec). Coarser-grained materials will remain unprotected and subject to natural erosion by stream flow.

The soil cement revetment would be removed from the site following sufficient evacuation of stored sediment from within the original reservoir limits. The removal will occur in stages over an up to 20 year period, dependent on criteria established in the monitoring and adaptive management plan (Exhibit 25) taking into account levels of sediment evacuation and limiting adverse effects downstream.

Dam Demolition will include construction of a small cofferdam to direct flows away from the dam during demolition. The portion of the dam at the left abutment will be demolished early to improve access to Highway 33. Following dredging of the Reservoir area, the remainder of the structure above the original streambed (approximate elevation 975 ft.) will be removed through controlled blasting, in approximately 15-foot vertical increments. Concrete rubble (77,000 cu. yds.) will be processed after blasting as required for transportation to a commercial concrete recycling plant.

B. <u>Background</u>. The Matilija Dam was built in 1948 (Exhibit 6). Almost immediately, problems with the dam were soon evident: large volumes of sediment were deposited behind the dam, reducing water supply and flood control (Exhibit 5); the dam began to deteriorate; the fish ladder did not function and fish passage was thus blocked; the riparian and wildlife corridors between the Ventura River and Matilija Creek were lost; and sediment transport was blocked, resulting in erosion/downcutting in downstream reaches of the Ventura River, the estuary and the sand-starved beaches along the Ventura County shoreline. At this time only a relatively small and shallow reservoir remains behind the dam, presently estimated to be about 500 acre-feet or 7% of the original capacity. Approximately 6 million cubic yards of sediment (silts, sands, gravels, cobbles and boulders) have accumulated behind the dam, and the dam is subject to overtopping during storm flows (Exhibit 7).

Consequently, due to the effects of the dam blocking steelhead trout migration and sand supply to the coast, and the reductions in its effectiveness as a flood control and water supply facility, in February 2000 the Corps initiated a reconnaissance study to determine whether it would have an interest in a cost-shared feasibility study of environmental restoration and dam removal. The Corps then initiated the Matilija Dam Ecosystem Restoration Feasibility Study (with the Ventura County Flood Control District (VCFCD), the owner of Matilija Dam, as the local sponsor for the project). The Corps states:

> *The Feasibility Study investigated options for the ecological restoration of Matilija Creek and the Ventura River (USACE, 2001), with particular attention focused on restoring anadromous fish populations on Matilija Creek and returning natural sand replenishment to Ventura County and other southern California beaches. The federally listed endangered steelhead, which historically had abundant runs in the Ventura River system, has been blocked access to over 50 percent of its prime spawning habitat in the upper reaches of Matilija Creek by the 1948 construction of Matilija Dam (Moore, 1980; Chubb, 1997; Capelli, 1999). In addition, beaches downstream in Ventura County have narrowed since construction of Matilija Dam, which has blocked an estimated 6,000,000 cubic yards of sediment to date (BOR, 2002). With a diminished supply of river-based sand replenishment (caused by dam construction, watershed improvements, and riverbed sand and gravel mining), beaches in the region are becoming increasingly eroded, causing habitat reduction and a loss of beach sand for recreational use (BEACON, 1989).*

The Corps estimates that by 2040, the reservoir will have reached an equilibrium condition and be completely filled with over 9 million cubic yards of sediment. The Corps also notes:

> *Historically, the Ventura River system supported a substantial number (approximately 4,000 to 5,000 spawning fish) of southern California steelhead, an endangered species of migratory trout. NOAA Fisheries most recent population estimates for steelhead are less than 100 adults for the entire Ventura River system. The steelhead habitat upstream from Matilija Dam was historically the most productive spawning and rearing habitat in the Ventura River system. It is estimated that about 17.3 miles of prime steelhead habitat was lost due to the construction of Matilija Dam.*
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> *Other physical barriers to fish passage include the Robles Diversion Dam* [Exhibit 23]*, less than two miles downstream of Matilija Dam on the Ventura River. This dam diverts water from Ventura River to Casitas Dam, the remaining significant surface water supply for the Ventura watershed and surrounding areas. The Casitas Municipal Water District is currently pursuing restoration for fish passage at the Robles Facility and implementation is expected by 2005.*
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> *The problems and opportunities identified in [the Feasibility] … study were used to describe specific planning objectives that represent desired positive changes in the without project conditions and provided focus for the formulation of alternative plans. The primary ecosystem restoration study objectives are:*
>
> - *Enhance aquatic and terrestrial habitat along Matilija Creek and the Ventura River to benefit native fish and wildlife species, particularly the endangered Southern California steelhead trout.*
>
> - *Improve the hydrologic and sediment transport processes to support the riverine and coastal regime of the Ventura River Watershed.*

- *Enhance recreational opportunities along Matilija Creek (including U.S. Forest Service land) and the downstream Ventura River system.*

Planning constraints also have been identified through the study process, particularly during meetings with the Sponsor, resource agency representatives and other stakeholders. Some of the key constraints that were considered in formulating and evaluating alternatives included:

- *Maintain the current level of flood protection along the Ventura River downstream of Matilija Dam.*

- *Limit adverse impacts to normal water supply quantity, quality and timing of delivery to Casitas Reservoir via Robles Diversion Dam.*

- *Limit impacts to water quality in Lake Casitas by potentially turbid flows resulting from the release of Matilija Dam trapped finer sediments.*

C. Status of Local Coastal Program. The standard of review for federal consistency determinations is the policies of Chapter 3 of the Coastal Act, and not the Local Coastal Program (LCP) of the affected area. If the Commission certified the LCP and incorporated it into the CCMP, the LCP can provide guidance in applying Chapter 3 policies in light of local circumstances. If the Commission has not incorporated the LCP into the CCMP, it cannot guide the Commission's decision, but it can provide background information. The project is outside the coastal zone. The local jurisdictions in the greater project area with certified LCPs are the City and County of Ventura. The Ventura County LCP has been certified by the Commission but has not been incorporated into the CCMP. The City of Ventura's LCP has been certified and incorporated into the CCMP.

D. Procedures - Phased Review. As is common for Corps projects submitted at the "Feasibility" stage, the Corps has yet to make final design decisions on several project elements, and certain project components and mitigation/monitoring plans have not been finalized, including consultation with the U.S. Fish and Wildlife Service and NOAA Fisheries, the finalized adaptive management plan, other biological, water quality, flood protection, water supply and other mitigation and monitoring plans, and access and recreation improvements.

Section 930.37(c) of the federal consistency regulations provides:

(c) In cases where the Federal agency has sufficient information to determine the consistency of a proposed development project from planning to completion, only one consistency determination will be required. However, in cases where major Federal decisions related to a proposed development project will be made in phases based upon developing information, with each subsequent phase subject to Federal agency discretion to implement alternative decisions based upon such information (e.g., planning, siting, and design decisions), a consistency determination will be required for

> *each major decision. In cases of phased decisionmaking, Federal agencies shall ensure that the development project continues to be consistent to the maximum extent practicable with the State's management program.*

As a result of the lack of specificity described above, the Corps has agreed to a phased review of the proposed project pursuant to 15 C.F.R. Section 930.37(c), and will submit an additional consistency determination to the Commission at a later date, prior to project finalization and implementation.

The Corps seeks this initial Commission concurrence in order to assure that federal funding will continue to be available for the project. The Commission's determination that the proposed project is consistent with the California Coastal Management Program (CCMP) is contingent on the Corps' agreement to submit a subsequent consistency determination for final project design, and on the Commission's ability to determine at that time whether the project remains consistent with the applicable resource protection policies of the CCMP described in the remainder of this document.

E. Federal Agency's Consistency Determination. The Corps of Engineers has determined the project to be consistent to the maximum extent practicable with the California Coastal Management Program.

II. Staff Recommendation. The staff recommends that the Commission adopt the following motion:

MOTION: **I move that the Commission concur with consistency determination CD-53-04 that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).**

STAFF RECOMMENDATION:

Staff recommends a **YES** vote on the motion. Passage of this motion will result in an agreement with the determination and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

RESOLUTION TO CONCUR WITH CONSISTENCY DETERMINATION:

The Commission hereby **concurs** with consistency determination CD-053-04 by the U.S. Army Corps of Engineers on the grounds that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

III. Findings and Declarations:

The Commission finds and declares as follows:

A. Coastal Streams and Wetlands, Water Quality, Marine Resources, and Environmentally Sensitive Habitat. The Coastal Act provides:

> ***Section 30230***. *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*
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> ***Section 30231***. *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment....*
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> ***Section 30232.*** *Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*
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> ***Section 30233***. *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to … [eight allowable uses].*
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> ***Section 30240***. *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
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> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

The project is intended to improve terrestrial and aquatic habitat conditions along Matilija Creek and the Ventura River for the benefit of fish and wildlife species. Removal of the dam would: (1) eliminate a barrier to fish passage on Matilija Creek, thereby facilitating the

migration, spawning, and rearing of southern steelhead (an endangered species); and (2) restore the natural sediment transport regime of Matilija Creek and the Ventura River, thereby improving downstream coastal beach sand replenishment.

Concerning overall project benefits (and including an overview of flooding and water supply issues, and project costs), the Corps' consistency determination states:

> *Flows and sediment transport from the Ventura River affect beaches east of the river mouth by providing a sediment input to the Santa Barbara Littoral Cell, an alongshore flow pattern that delivers sediment along beaches in a west-to-east direction from Ellwood in Santa Barbara County to Point Mugu in Ventura County (BEACON, 1989). The main sources of natural sand supply are from cliff erosion and episodic delivery of sediment from the streams and rivers that discharge into the river on a five- to ten-year periodic basis. Beaches along this region are becoming increasingly eroded due to lack of replenishment from input sources. The region from Emma Wood beach to Point Mugu has a wider berm width than the eastern portion of the littoral cell, but is receiving increased erosion stress, leading to greater sand depletion and beach recession. The removal of the Matilija Dam presents a potential to not only return sediment inputs from the Ventura River closer to original levels, but also the opportunity to provide beach replenishment through the transport of sediment that has collected behind the dam (BEACON, 1989).*
>
> *The Recommended Plan is Alternative 4b. The Recommended Plan includes full dam removal in one phase. Portions of the trapped sediment will be removed by slurry line to a downstream 118-acre disposal site, in the proximity of Highway 150 Bridge, and the remaining two-thirds of trapped sediment will be contoured to restore a fish passage channel, allowing storms to naturally erode sediments downstream. Four sediment storage sites will be used in conjunction with the construction of the fish passage channel, and soil cement will protect these sites from erosion for the more frequent storm flows (less than 10 year return periods). These actions will lessen turbidity levels downstream, except for larger storm events, reducing potential adverse impacts to fish migration and water diversion activities along the Ventura River.*
>
> *Removal of Matilija Dam will cause erosion trends downstream to reverse and become depositional trends, eventually restoring more stable (equilibrium) conditions to the Ventura River reaches. The deposition would recreate a riverine morphology, in terms of channel and riverbed materials characteristics, similar to pre-dam conditions. The estimated timeframe to reach equilibrium is approximately 10 years for the Recommended Plan.*
>
> *Ecosystem restoration measures also include exotic and invasive species removal and planting of native species in the downstream reaches. Recreation measures will also be implemented involving a system of trails and interpretive centers.*

> *Ecosystem restoration benefits for this study have been prepared using a modified Habitat Evaluation Procedure (HEP) analysis. The Average Annual Habitat Units (AAHUs) have been computed over a 50-year period. The Recommended Plan will restore the Matilija Creek ecosystem to natural riverine predam conditions, thereby providing fish passage for the steelhead to over 17 miles of critical habitat. It is estimated that this can result in restoration of a healthy and sustainable adult steelhead population, similar to what existed prior to the construction of Matilija Dam.*

While designed to improve coastal resources overall, due to the project's temporary impacts on a number of downstream coastal resources, Coastal Act analysis under the above-(and later-) referenced Coastal Act policies (including Sections 30231, 30233, 30240, 30253 and 30254) requires an alternatives analysis to determine the least environmentally damaging feasible alternative way to implement the project's goals. The Corps performed an extensive alternatives analysis, summarized as follows:

> *A full array of structural and non-structural measures were formulated to address identified problems and opportunities, including measures related to dam removal, no dam removal, mechanical and natural sediment transport, stabilization of deposited sediments, levee and bridge modifications, protection of existing water supply facilities, recreation, and exotic and invasive species management.*

The Corps refined this analysis to review in detail a final array of seven alternatives: six action alternatives and the No Action plan. The Corps states:

> *Criteria used in the evaluation include impacts related to sediment deposition and turbidity, flooding, beach nourishment, changes to the dam site topography, biological and cultural resources, water supply, and air quality noise and traffic. Features common to each alternative include removal of Matilija Dam; restoration of fish passage; reestablishment of natural hydrologic and sediment transport processes from the upper Matilija Creek watershed; management of the sediment trapped behind the dam; removal of exotic and invasive species, particularly giant reed (Arundo donax) from the reservoir basin, upstream of the basin, and in the downstream reaches of the Ventura River, and non-native predatory species from the dam lake and immediately downstream of the dam, particularly largemouth bass, sunfish, catfish and bull frogs; and mitigation measures for impacts to flooding and to water supply. Recreation measures include trails and associated facilities.*

Under the "No Action" alternative, the dam would remain in place and monitored for safety purposes, but no modifications would be made. Under this alternative, the Corps estimates an additional 3 million cubic yards of sediment would accumulate behind the dam over the next 35 years, resulting in about 9 million cubic yards of sediment trapped behind the dam by 2038. The existing reservoir would disappear by 2020, downstream water diversion operations would

be adversely affected, giant reed (*Arundo donax*) would continue to overtake existing native species, steelhead would not have access to prime spawning and juvenile rearing habitat above Matilija Dam, and no maintained recreation trails would be created around Matilija Dam.

Alternative 1 would be full dam removal in one phase and mechanical removal of the trapped sediment, with the marketable portion of the trapped sediment (3.0 million cubic yards) processed and sold on-site as aggregate. Non-marketable, fine-grained sediments (2.1 million cubic yards), would be slurried downstream. Additional fine-grained residual sediment remaining after the completion of the aggregate processing operation (770,000 cubic yards) would be trucked to the same disposal site. To convey creek flows and to protect the aggregate operation, a 60-foot wide channel (base width) would be constructed along the west side of the reservoir basin. The bottom of the channel would be similar to the pre-dam channel bottom to allow natural gradients easily accessible by fish. The channel would be protected on the east side with soil cement along the side slope extending 13 feet above the channel bottom and 5 feet below. The channel capacity would contain a 100-yr storm event. The soil cement, constructed using on-site aggregate, would be removed following completion of the aggregate sale operation.

Alternative 2a would be full dam removal in one phase and natural (fluvial) transport of a portion of trapped sediment. The fine sediment deposited beneath the existing lake (2.1 million cubic yards) would be slurried downstream. The remaining trapped sediment would be allowed to be eroded downstream by storm events and natural fluvial processes. To convey flows, a shallow pilot channel not exceeding 10 feet deep would be excavated through the reservoir basin.

Alternative 2b would be full dam removal in one phase and natural (fluvial) transport of all of the trapped sediment. The trapped sediment would allowed to be eroded downstream by storm events and natural fluvial processes. To convey flows, a shallow pilot channel not exceeding 10 feet deep would be excavated through the reservoir basin.

Alternative 3a would be incremental removal of the dam and natural (fluvial) transport of a portion of trapped sediment. The dam demolition would be conducted in two phases. In Phase 1, the fine sediment deposited beneath the existing lake (2.1 million cubic yards) would be slurried downstream, followed by the removal of the dam structure to an elevation of 1000 ft. To convey flows, a shallow pilot channel (not exceeding 10 feet deep) would be excavated through the reservoir basin. Phase 2 removal of the remaining portion of the dam would begin once the sediment level in the reservoir reached (by natural fluvial erosion) an equilibrium condition with the modified dam height resulting from Phase 1.

Alternative 3b would be incremental removal of the dam and natural (fluvial) transport of all of the trapped sediment. The dam demolition would be conducted in two phases. In Phase 1, the dam would be removed to an elevation of 1030 ft. All materials excavated for the removal of this portion of the dam would be placed upstream in the reservoir basin. To convey flows, a shallow pilot channel not exceeding 10 feet deep would be excavated through the reservoir

basin. Phase 2 removal of the remaining portion of the dam would begin once the sediment level in the reservoir reached an equilibrium condition with the modified dam height resulting from Phase 1.

Alternative 4a would be full dam removal in one phase and long-term storage of a portion of the trapped sediment within the reservoir basin. The fine sediment deposited beneath the existing lake (2.1 million cubic yards) would be slurried downstream. A 100 ft. wide channel (base width), following a pre-dam alignment, would be excavated in the reservoir basin to an elevation similar to pre-dam levels. The channel, lined with riprap stone protected side slopes extending 11 feet above channel bottom and 5 feet below, would have a design capacity to convey the 100-year flood event. Excavated materials would be permanently stockpiled in storage areas located within the reservoir basin.

Alternative 4b (the proposed alternative) is full dam removal in one phase and short-term storage of a portion of the trapped sediment within the reservoir basin. The fine sediment deposited beneath the existing lake (2.1 million cubic yards) is slurried downstream to the site shown in Exhibits 10-15. A 100- foot wide channel (base width), with a pre-dam alignment, is to be excavated through the reservoir basin to the pre-dam invert (streambed) elevation. The channel side slopes in the lower half of the reservoir basin would be lined with soil cement, approximately 7 feet high. The revetment height would be overtopped by flows exceeding 12,500 ft^3/sec (10-yr storm event). Excavated materials are to be stockpiled in storage areas located within the reservoir basin. Soil cement revetment would offer a higher level of protection in portions of the basin where trapped sediment, or the adjacent stockpiled sediment, contain more fines content. All soil cement would be removed from the site following sufficient removal by erosion of the trapped sediment. The removal would be performed in stages.

Comparing the alternatives, the Corps states:

> ***Comparison and Evaluation of Alternative Plans***
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> *Removal of Matilija Dam would cause erosional trends in the Ventura River to reverse and become depositional trends, and finally a balanced condition (equilibrium) to occur. The deposition would re-create a riverine morphology, in terms of channel and riverbed materials characteristics, more similar to pre-dam conditions. The time to reach equilibrium is different for the alternatives. Alternatives 1 and 4a would reach equilibrium in 50 years, while Alternatives2a, 2b, 3a, 3b within 10 years, and Alternative 4b within approximately 20 years. For the future without-project conditions (No Action Alternative), equilibrium would occur within approximately 100 years. Erosional trends are still likely to continue, though at a slower rate depending on the action alternative, between river mile 5 and 3. The main cause for this is channel constriction by bridges and the presence of Casitas Dam and San Antonio Creek Watershed debris basins.*

Sediment delivery to the ocean, and resulting benefits to beach nourishment, would occur sooner for the action alternatives as compared to the No Action Alternative. Time frames would be similar as those described for the establishment of riverine equilibrium. Over a period of 50 years, increases in sediment delivery volumes would be approximately one- third greater than the No Action Alternative for sand, gravel, and cobble-sized sediment. The Beach Erosion Authority for Control Operations and Nourishment (BEACON) has estimated that a cubic yard of sand roughly equates to a square foot of dry sand on the beach. Detrimental effects related to the restoration of increased sediment transport to the shoreline include the short-term impacts of fine sediments on local crustaceans, and the potential increase in future dredging at the Ventura and Channel Islands Harbors due to longshore transport of increased sediments from the Ventura River. Since the increase in volumes of fines and sands are relatively small when compared to the No Action Plan, the detrimental impacts are not considered significant for this study.

The associated effects of releasing trapped sediment downstream, i.e. increased riverine sediment deposition and turbidity levels, will cause short-term adverse impacts to riparian communities, aquatic wildlife and habitats. The impacts however are considered beneficial overall since the system would recover with time.

The process of returning the river to pre-dam conditions will increase the flood risk to infrastructure that has developed along the river corridor since the construction of the dam. As a result, flood control improvements are necessary. Alternatives 2a, 2b; 3a, 3b, and 4b will require more flood protection ("higher level") than Alternatives 1 and 4a ("lower level") since trapped sediments from the dam will be released downstream. Both levels of protection assume purchase of the Matilija Hot Springs property, purchase and removal of Camino Cielo structures, removal and replacement of the Camino Cielo Bridge and restoration of the channel width at the current location, and extension of the Santa Ana Bridge with local channel widening. Improvements also include constructing new and raising existing levees and floodwalls. Locations will include Meiners Oaks (up to 3 feet maximum above the river bank for the "lower level" and 5 feet for "higher level"), Live Oak Acres (up to 2 feet maximum above the existing levee for the "lower level" and 6 feet for "higher level") and Casitas Springs (up to 2.5 feet maximum above the existing levee for the "lower level" and 5 feet for "higher level"). The levee and floodwall at Meiners Oaks will be new features. The source for earth fill materials for the levees is assumed to be from Matilija Dam reservoir basin.

Impacts to water supply due to elevated sediment levels (both coarse- and fine-grained) at the Robles Diversion Dam and Foster Park would require some mitigation. At the Robles diversion facility, a sediment bypass (consisting of four radial gates) would be constructed at the existing sediment basin to allow increased sediment loads to be flushed downstream of the facility. This would be required for all of the action alternatives. The radial gate system would allow for diversion operations to be maintained at a wider range of river flows. Additional modifications would also be necessary to the existing weir (timber crib) structure.

> *For two of the alternatives (2b,3b), even with a high-flow sediment bypass in place, the impacts from fine sediment in the initial years (and potentially longer in case of a drought period) would overwhelm the facility by clogging the fish screen in the diversion canal and causing operations to cease for the respective season while maintenance cleanout could be performed. These alternatives would necessitate replenishment of the losses to Lake Casitas safe yield by purchase of replacement water from an outside purveyor.*
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> *For Alternative 2a and 3a, it is expected that turbidity impacts at Lake Casitas will likely result in water quality problems including prolonged duration of algal bloom production and potential increases in water treatment efforts. Because of the uncertainties related to level and duration of impacts, especially in a drought scenario (where low flows could still transport turbid loads), a desilting basin to settle out fines prior to conveyance to Lake Casitas would be included.*
>
> *For Alternative 4b* [the proposed alternative], *turbidity impacts at Robles Diversion Dam are expected to be much less than Alternative 2a or 3a due to the presence of channel protection (soil cement revetment) in a portion of the reservoir basin where sediments contain higher levels of fines. The soil cement revetment will assure that flow levels less than the 10-year event will not allow erosion of the protected finer materials. Turbidity levels associated with these levels of flow events would therefore be similar to existing conditions. Even during a drought situation, turbidity levels would not be aggravated. For flow events larger than the 10-year event, the soil cement revetment would be overtopped, and flows would have access and cause erosion of the finer materials. The increase in turbidity levels would be of limited duration and would likely be within the natural variability of existing conditions levels. Eventual staged removal of the revetment will cause increases in turbidity levels to possibly higher limits for a temporary period. The removal time frame would be based on monitoring and adaptive management and would not coincide in periods of on-going drought when Lake Casitas levels would be lower than normal.*
>
> *For Alternative 4b, as part of a locally preferred betterment, a desilting basin has been included. At Foster Park, two additional groundwater wells would be constructed to offset the losses from interruption of surface water diversion operations when turbidity levels are above the maximum limit of 10 NTU* [Nephelometric Turbidity Units]. *The wells would only be necessary for Alternatives 2a, 2b, 3a, 3b and 4b. At this time, the wells are also included for Alternatives 1 and 4a due to the susceptibility to erosion and loss of fines associated with one of the slurry disposal areas.*
>
> *Alternative 1 has the highest impacts to the community in terms of truck traffic resulting from aggregate sale operations.*

In selecting Alternative 4b as the proposed alternative, the Corps states:

> *The benefits associated with the alternatives are presented in non-monetary terms (Habitat Units). Ecosystem restoration benefits for this study have been prepared using a modified HEP* [Habitat Evaluation Procedure] *analysis. The Average Annual Habitat Units (AAHU) have been computed over a 50-year period. Alternative 4b provides the*

> *most net benefits to the ecosystem based on the HEP analysis with an overall increase of 731 AAHU when compared to the baseline conditions (No Action Alternative). The outputs for Alternative 2a, 2b, 3a, and 3b however are in a relatively close second position with benefits of 678 AAHU. There is a more distinct separation with the next lower value associated with Alternative 1 (609 AAHU), followed by Alternative 4a (554 AAHU).*
>
> *Alternative 4b has the lowest average annual cost per AAHU. From a cost effectiveness perspective, an alternative is cost effective if there are no other alternatives that provide the same output at a lower cost. Therefore Alternative 4b is the most cost effective alternative. An incremental cost analysis is not necessary since there are no changes in output levels to be compared and levels to be selected except for the No Action Alternative. The incremental average annual cost per incremental average annual habitat unit is $8,890. It is recommended that Alternative 4b be considered as the NER plan.*

The Corps also states:

> *In a consensus decision, the Sponsor and the majority of the stakeholder participants of the Plan Formulation Group have identified Alternative 4b as the preferred plan. In addition however to the NER plan, a desilting basin will be included as an additional feature to Alternative 4b. The desilting basin is considered a project betterment.*

The Corps concludes:

> ***Recommended Plan***
>
> *Alternative 4b with the addition of a desilting basin as a local betterment has been chosen as the recommended plan. The total project cost is $110,000,000. This includes recreation costs ($1,000,000) and the betterment feature (desilting basin) at the Robles diversion facility ($5,700,000).*
>
> *The efforts for the Matilija Dam Ecosystem Restoration Recommended Plan encompass a watershed scale and would restore essential physical and natural processes responsible for creating and sustaining habitats and ecosystem functions that support a wide variety of native species, including listed species. The Plan would also benefit current weak stocks of southern steelhead by providing the species access to historically high quality spawning and rearing steelhead habitat.*

Concerning temporary habitat impacts during the dam removal project, the Corps' consistency determination states:

> ***Vegetation and Wildlife Habitat****. The removal of the Matilija Dam would potentially result in short term significant impacts to vegetation and wildlife habitat occurring in the Matilija Reservoir. Specifically, impacts to riparian vegetation and wildlife habitat would occur during demolition of the dam, vegetation clearing within Matilija*

reservoir and the Ventura River, levee expansion and construction, and the establishment of slurry disposal sites and desiltation basins. Impacts associated with these activities are fully described in the EIS/EIR. Demolition of the Matilija Dam would require the removal of all existing riparian vegetation located within the Matilija Reservoir and sections of giant reed infestation within the Ventura River. Habitat within this area would be temporarily lost and impacts would be considered significant. However, these impacts are expected to be short-term and revegetation of the area after dam removal would ultimately provide quality upland and riparian wildlife habitat and restore several miles of prime steelhead spawning habitat along Matilija Creek. Therefore, the benefits that would occur over time in this area, including the removal of non-native plant and animal species, would likely offset any initial adverse impacts that would occur during dam removal. Further, the implementation of project mitigation measures including clearing vegetation outside the breeding season, trapping and relocating wildlife prior to and during construction, and monitoring vegetation clearing in sensitive areas, would minimize impacts to wildlife.

Impacts to vegetation and wildlife habitat from development of the desiltation basin and slurry disposal site would be considered adverse but not significant. The removal of invasive giant reed from the Ventura River would also temporarily affect wildlife habitat but would be considered a short-term impact and would ultimately provide for the enhancement of riparian and wildlife habitat. No project related impacts to vegetation or wildlife habitat would occur in the estuary, adjacent beach, or inter- tidal zones.

Concerning potential downstream impacts to the marine environment, the Corps' consistency determination states:

***Marine Plants**. No marine plants or algae would be directly or indirectly affected by construction activities associated with the removal of Matilija Dam. Macro-algae including feather boa kelp and giant brown kelp occurs in limited quantities near the mouth of the Ventura River. The benthos in this area contains a mixture of sand and cobble with sparse populations of algae. Wave action continually tumbles the cobble and boulders and creates a harsh environment that limits the recruitment of algal species in this area. The closest established kelp beds are located approximately four miles west of the estuary (Section 4.3 of the EIS/EIR). Sediment transported downstream of the dam is not expected to substantially alter the benthos in this area. Direct and indirect impacts to the estuary, inter-tidal zone, and marine plants and algae due to sediment transport are not expected, as sediment would be stored in upland sections of the river. Upstream reaches of the river are currently sediment starved and would accumulate any downstream transport of sediment (BOR, 2003). Benefits to the estuary by increased sediment transport are not expected to occur for approximately 20 years (VCWPD, 2004). The distances of the kelp beds offshore from*

the mouth of the Ventura River are sufficiently great that significant impacts to marine plants are unlikely to occur as a result of the project. Therefore, these impacts would be considered less than significant.

No impacts are expected to occur to marine fishes as a result of dam removal activities. As discussed above, sediment would be stored in upland areas and would only be washed downstream during significant storm events. In addition, the Ventura River is sediment starved and would accumulate the majority of sediment in upstream reaches of the river. This would limit the amount of material that would wash downstream and potentially affect marine fishes. Therefore, impacts to marine fishes would not be considered significant.

Concerning impacts on and benefits to fish in Matilija Creek and the Ventura River, the Corps' consistency determination states:

***Fishes**. Temporary impacts to the fish community located within the Matilija Reservoir would result from demolition activities including draining of aquatic habitat, vegetation clearing, and during the removal of Matilija Dam. However, this habitat would eventually be eliminated as the reservoir continues to fill with sediment. Although native rainbow trout may occur in the reservoir, exotic predatory fish and amphibians including largemouth bass, green sunfish, and bullfrogs dominate the impoundment located behind the dam. There is some potential for downstream impacts to native fishes from the release of exotic fish species during dam removal. By draining the reservoir prior to dam removal and implementation of mitigation measures, including an exotic species removal program, impacts to native fishes would be reduced to less-than-significant levels. Potentially significant impacts to native fishes could also occur as a result of mechanical smothering, abrasion, or loss of rearing habitat due to sediment deposition in reaches below the dam. These impacts would be considered significant but short term, and would not likely jeopardize the continued existence of native fishes. In addition, long-term benefits from dam removal and the eradication of exotic predatory species would provide overall beneficial impacts to native fishes. Potential impacts could also occur during the removal of giant reed or levee expansion. These impacts would be considered adverse but less than significant with mitigation. Mitigation wou1d include pre-construction surveys for sensitive species, conducting work during the dry season, and implementation of best management practices to reduce impacts from downstream sediment transport.*

***Essential Fish Habitat (EFH)**. Project activities associated with removal of the Matilija Dam are not expected to impact EFH in marine or estuarine habitats and would not affect any Fishery Management Plan (FMP) species. Impacts to EFH for steelhead may temporarily occur in upstream reaches of the Ventura River and in Matilija Creek. Dam removal may result in downstream sediment transport resulting in the temporary loss of breeding habitat, mechanical smothering, loss of foraging*

> *habitat, and increased predation rates. These effects would be short term, and removal of Matilija Dam would allow access to 16 miles of prime steelhead spawning habitat. Because the removal of Matilija Dam is required to provide access to these historic spawning grounds, the proposed project would be considered a beneficial effect despite potentially significant short-term impacts to steelhead.*

Concerning loss of reservoir habitat for birds, the Corps acknowledges that removal of the dam and reservoir would reduce the amount of lacustrine habitat available for a variety of shore and water birds. However it notes that as the reservoir continues to fill with sediment, this habitat: "... would eventually be reduced or eliminated within several years." The Corps notes that the proposed removal of exotic species including giant reed, which currently dominates the vegetation within the reservoir, would benefit native riparian vegetation and a return to natural stream dynamics. The Corps also states that:

> *"… studies have indicated that following dam removal fish and wildlife diversity dramatically increase in formerly impounded streams. Therefore, the overall benefits to shore and water birds in this area by removing Matilija Dam outweigh the loss of this artificial habitat. In addition, suitable lacustrine habitat occurs at nearby Lake Casitas.*

In terms of impacts to shorebirds, the Corps also points out that future beach-enhancing benefits from the proposed dam removal should provide expanded areas for shorebird resting and foraging.

Concerning threatened and endangered species, the Corps states that the project has the potential to affect approximately 35 species of threatened, endangered, rare, or of special concern status (including the California red-legged frog, southwestern pond turtle, steelhead, arroyo chub, osprey, and peregrine falcon), but that only eight federal- or State-listed as threatened or endangered species and six federal or State species of special concern "have a high likelihood or occurring in the proposed project area." The Corps states:

> *Short-term construction-related impacts could occur as a direct result of demolition activities associated with dam removal, vegetation clearing, and excavation of sediments. Other potential sources of direct mortality to wildlife may include ground disturbance activities and access by construction vehicles during pipeline construction. Clearing, grading, excavating, and/or burying habitats could also lead to mortality of small mammals, reptiles, and nesting birds with eggs or young. Impacts to wildlife and water quality may also occur as a result of accidental fuel spills.*

While the project is intended to benefit steelhead habitat in the long term, short term impacts to steelhead could be adverse; the Corps notes:

> *One species has the potential to be significantly impacted by project construction. Short-term significant impacts to the steelhead may result from the dispersion of sediments into the water column during dam removal and sediment stabilization activities. Sediments could damage spawning grounds and negatively impact water, habitat, and food quality. Large sediment pulses may partially or completely fill channels, resulting in temporary or permanent changes to the channel course. Sediment and fine particulate matter can also lower the oxygen content in nesting gravels resulting in mortality to egg masses and emerging steelhead. Increases of sediment may also fill in pools and spawning habitat, clog gill structures, reduce visibility, and result in abrasions to migrating fish. Although potentially significant impacts to this species may occur, these effects would be short-term and the removal of Matilija Dam would allow access to 16 miles of prime steelhead spawning habitat. Demolition of Matilija Dam is required to provide access to these historic spawning grounds, and the proposed project would be considered a beneficial effect despite potentially significant short-term impacts.*

To address the project's short-term habitat impacts, the Corps has coordinated with the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NOAA Fisheries), and the California Department of Fish and Game (CDFG). A preliminary "Planning Aid Report" (July 2003) from the USFWS recommends the following habitat protection measures:

- *Continued surveys for Federal endangered least Bell's vireo and southwestern willow flycatcher should be conducted in the present study area.*

- *To avoid impacts to nesting birds, a monitoring program for such activity should be developed in the project area, particularly in the vicinity of the reservoir.*

- *Surveys for bats should be conducted in the vicinity of the dam.*

- *An Arundo eradication project should be initiated prior to initiation of dam removal. Tamarisk and other non-native invasive plants encountered should also be removed. Measures to prevent the spread or introduction of these species, such as avoiding areas with established native vegetation, restoring disturbed areas with native species, and post-project monitoring and control of exotic species should be developed.*

- *An intensive eradication program for bullfrogs, crayfish, and green sunfish should be completed prior to initiation of a dam removal project both within the reservoir and downstream of the dam. Eradicating these species from the reservoir prior to dam removal will prevent any downstream relocation. Downstream eradication of non-native species may result in lower mortality to native species.*

- *A relocation plan for the California red-legged frog, southwestern pond turtle, coastal whiptail, two-striped garter snake, and other special status species should be developed and initiated prior to initiation of a dam removal project. Other native species should also be considered for possible relocation out of the project area.*

- *Revegetation and stream restoration programs should be developed prior to the start of any dam removal activities. A native plan nursery should be developed at or near the project site to provide a source of plants and trees for revegetation. Cultivation of locally native tree species should be initiated as soon as possible to help incorporate multiple age class forests in the revegetation plan.*

- *A wildlife care facility should be contracted to treat sick, injured, or orphaned animals found in the study area.*

- *A reintroduction program for arroyo toad and California red-legged frog into the study area should be evaluated.*

- *There should be no-net loss of in-kind natural habitat.*

- *Mortality and injury to species within the project site could be reduced by minimizing and clearly demarcating the boundaries of the project areas and equipment access routes and locating staging areas outside of sensitive areas. Avoiding work activities during the breeding season would reduce adverse impacts to sensitive species.*

- *Improper handling, containment, or transport of individual species should be reduced or prevented by use of qualified biologists.*

- *The creation of nuisance ponds in the project area that may render native species vulnerable to predatory species should be avoided.*

- *Project workers should be informed of the importance of keeping the project site free of trash to avoid attracting predators to the project site, which could harass or prey on aquatic species.*

- *Project workers should be informed of the importance of preventing hazardous materials from entering the environment. Locating staging and fueling areas a minimum of 65 feet from riparian areas or other water bodies, and by having an effective spill response plan in place could reduce harmful effects and mortality to wildlife.*

- *Best management practices should be implemented and the area to be disturbed should be reduced to the minimum necessary to assist in reducing the amount of sediment that is washed downstream as a result of project activities.*

- *Project workers should be informed of the presence of species and the measures that are being implemented to protect them during project activities.*

- *In the event that the project proceeds forward with an alternative that releases sediments downstream of the dam, this recommendation is offered. Monitoring of benthic invertebrates, amphibians, reptiles, fishes, birds, vegetation, and wetlands should be considered downstream of the dam in Matilija Creek, Ventura River, and Ventura River estuary.*

In addition to these measures, concerning water quality impacts the Corps has included a number of water quality mitigation measures (listed in Exhibit 24 - Measures ER-1 to ER-4), including development of a Storm Water Pollution Prevention Plan (SWPPP) and implementation of Best Management Practices (BMPs). The Corps has also included measures to protect water quality from risks of spills, including preparing a Spill Prevention, Containment and Countermeasures Plan that will specify fueling procedures, equipment maintenance procedures, and containment and cleanup measures to be followed in the event of a spill. At a minimum, this plan will include: (a) measures to control handling and storage of construction and maintenance fluids; (b) immediate control, containment and cleanup of fluids released because of spills, equipment failure (broken hose, punctured tank) or refueling; (c) proper disposal of any contaminated materials; (d) refueling of portable equipment shall occur within a contained areas; (e) where needed, barriers placed around sites where the fuel nozzles enter fuel tanks; (f) monitoring refueling activities; and (g) an environmental training program to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, to all field personnel. The Corps will also implement an overall monitoring program to ensure that the plans are followed throughout the construction period.

Concerning removal of invasive species, the Corps has also agree to prepare a "Giant Reed Eradication Plan," which will include *Arundo donax* removal and monitoring, and which will be submitted to the CDFG and USFWS for review and comment prior to implementation. The plan will include measures to prevent permanent or temporary impacts to wetlands and associated, sensitive vegetation and wildlife during herbicide treatments of giant reed. The plan would provide that all activities requiring herbicide treatment will: (a) ensure that herbicides are not applied during the wet season (November 1st to April 15th); (b) ensure that only water-safe and surfactant-free herbicides are used (treatments shall use a glyphosate-based herbicide including Rodeo® and/or Aquamaster®, both of which are labeled for use within water); (c) ensure that herbicides are applied at concentrations that are considered safe for biological resources within and adjacent to the project area; (d) ensure that herbicides are mixed with non-toxic water soluble dye of low toxicity that highlights treated areas; (e) minimize overspray of herbicides onto on-target species by restricting herbicide spraying when wind velocities exceed 6 mph; (f) minimize trampling of native vegetation by establishing marked trails prior to project implementation; (g) remove dead giant reed material that was foliar treated and left in place to avoid fire hazard potential prior to the beginning of the fire season; and (h) have a licensed professional conduct or oversee herbicides applications.

In addition to these preliminary recommendations and measures, the Corps will ultimately need to obtain a final Coordination Act Report and Biological Opinion from the USFWS and NOAA Fisheries. The Corps states:

> *Through the implementation of project mitigation measures (fully described in the EIS/EIR), impacts to other listed species including tidewater goby), brown pelican, snowy plover, and California least tern would either be avoided or reduced to less-than-significant levels. Mitigation measures include, but are not limited to, pre-construction biological surveys, trapping and relocating sensitive species such as red legged frog and southwestern pond turtles, conducting initial vegetation clearing outside the breeding season for sensitive birds, construction monitoring by qualified biologists, an exotic species removal program, implementation of construction best management practices to minimize downstream sediment transport, and long-term monitoring of the riparian ecosystem downstream from Matilija Dam. The removal of the dam, exotic predatory species, giant reed, and a return to natural fluvial dynamics would provide an overall net benefit to sensitive species occurring in the Ventura River and estuary. Therefore, long-term significant impacts to sensitive species are not expected.*

While clearly acknowledging these long-term benefits and supporting the project's overall goals and objectives (Appendix A), NOAA Fisheries states that a number of assumptions and mitigation measures remain untested and/or incomplete, including: (1) the justification, analysis of impacts, and review of alternatives for proposed sediment placement in the floodplain, desiltation facilities, water supply facilities, and levees and floodwalls; (2) habitat protection, revegetation plans, and specific locations for areas planned to receive temporary sediment placement; (3) fine sediment impacts to existing gravel beds and river geomorphology, and fish passage facilities being constructed at the downstream Robles Diversion Dam; (4) protocols and remediation efforts to be included within the proposed adaptive management plan (Exhibit 25); (5) analysis of the possible need to modify fish passage facilities at Robles Diversion Dam during high river flows; (6) an alternatives analysis for the proposed replacement of the Santa Ana River bridge; (7) plans for invasive species (*Arundo donax*) removal; and (8) consideration of interpretive facilities.

The Corps acknowledges that for a project of this magnitude and precedence, a number of uncertainties about the effectiveness of the proposal and the mitigation measures remains. The Corps states:

> *For the Recommended Plan there is considerable uncertainty regarding the transport of sediments and their impacts on ecosystem and other mitigation features of the project including downstream water quality, impacts to ecosystem restoration features, and flooding and water supply impacts. The effectiveness of revegetation efforts and eradication of exotic species are also uncertainties that need to be monitored with respect to project performance and achieving output objectives. The monitoring of*

sediment transport and revegetation and exotic species eradication shall be accomplished through yearly surveys of sediment deposits and quantities to assure unforeseen performance results do not degrade the restored ecology or increase flooding or water supply impacts. Adaptive management measures to address unforeseen sediment transport impacts to be considered include partial or complete removal of deposits as well as further stabilizing sediment sources in the reservoir areas. Additional eradication of exotics and revegetation may also be needed to achieve project performance objectives.

Considerable uncertainty exists regarding removal of dams and sediment impacts as related to achieving restoration objectives and minimizing adverse impacts. This is because very few such projects involving dam removal, especially large projects of the magnitude of Matilija Dam removal, have been completed to date. Given the lack of precedent and scarcity of empirical data regarding restoration of natural historic ecology riparian systems there is a great degree of uncertainty regarding a number of aspects of the design, construction and operation of the recommended alternative.

Uncertainty exists regarding:

- *The volumes and frequency of sediment transport and downstream deposition and turbidity.*
- *The densities of initial revegetation and the associated success rates.*
- *The frequency of flood events and their impacts on restored habitat.*
- *The effectiveness of certain exotic species such as arundo.*
- *Planned invasive plant management activities and schedules.*
- *The effectiveness of relocating certain species such as red-legged frogs and species of significance presently existing in the reservoir lake area.*

To address these uncertainties, the Corps proposes an adaptive monitoring and management plan which will: "… evaluate the effectiveness of the restoration measures implemented in this project and make adaptive changes, if required, to obtain project objectives." Accordingly, the Corps states:

The Monitoring and Adaptive Management Plan for the Recommended Plan has been developed by the Environmental Working Group, with input from the Technical Studies Working Group. The goal of this effort is to restore the pre-dam natural ecology of Matilija Creek and allow species to have unobstructed access to and from the upper watershed habitat and achieve other natural habitat and ecosystem improvements. It is expected that the habitat value of the restored natural river regime will have good to above average quality. It is also expected that the restored habitat will be suitable for native wildlife. The quality of the habitats (i.e., average or high) is expected to dictate the abundance or density of wildlife. Additional goals of the Monitoring and Adaptive Management Plan include, but are not limited to, the following actions: 1) monitor deposition and erosion in the riverine system and at the estuary and to take necessary

actions to reduce any adverse impacts including blockage to fish passage and increase to flooding risks; 2) monitor erosion of trapped sediment from the reservoir basin, performance of the soil cement protection, and plan and execute staged removal of soil cement; 3) monitor turbidity levels and suspended sediment concentrations with the intent to minimize impacts to water supply; 4) monitor water quality for regulated substances potentially transferred to the water by trapped sediments associated with Matilija Dam, and provide any necessary mitigation measures in accordance with consultations with the Regional Water Quality Control Board; and 5) monitoring effects of sediment bypass to sediment deposition and diversion operations at the Robles Facility, and also effects to the fish passage facility function and operation, with the intent to minimize any impacts to current operating criteria of the diversion facility. Further refinement and/or additional goals will be established during the PED phase.

The Monitoring and Adaptive Management Plan will provide a description of: the habitats to be restored, the density and composition of the plantings to restore habitat, surveys to monitor the expected, natural re-introduction of native wildlife into the restored habitats, the monitoring protocols, and the performance or criteria and monitoring protocol to evaluate success of the restoration effort. The plan will also present adaptive management actions (or maintenance activities) that may be performed to ensure a successful restoration effort and reporting requirements.

The Monitoring and Adaptive Management Plan covers monitoring and adaptive management actions during the first 5 years after initial construction. After the first 5 years, monitoring and/or adaptive management becomes the responsibility of the Local Sponsor. During the PED phase, more specific monitoring details (e.g., exact monitoring transect locations, reference site locations, more specific performance/success criteria, more specific monitoring protocols, etc.) will be added to the Monitoring and Adaptive Management Plan.

The Corps and/or the non-Federal Sponsor will be responsible for collecting monitoring data and preparing annual Monitoring Reports. A Technical Committee consisting of, at least, U.S. Fish and Wildlife Service, National Marine Fisheries, California State Fish and Game, and possibly other agencies or organizations, will assist in collection of monitoring data, review monitoring data results, and provide recommendations of possible adaptive management measures. The Technical Committee will recommend adaptive management measures to the existing project's design should habitat not achieve the identified goal and objectives. If designed vegetation species composition are not achieved: replanting, additional irrigation, and/or removal of vegetation (especially exotics) may be necessary. Annual Monitoring Reports and any adaptive management measures recommended by the Technical Committee will be forwarded to an Executive Committee that will consist of, at least, a representative of the non-Federal Sponsor and Matilija Dam Ecosystem Restoration Feasibility Study the U.S. Army Corps of Engineers. The Executive Committee will

decide whether to adopt adaptive management measures recommended by the Technical Committee.

The Commission concludes that the project's overall goals of improving terrestrial and aquatic habitat, particularly the improvement of steelhead migration through removing a major barrier to fish passage, facilitating the migration, spawning, and rearing of southern steelhead (an endangered species), and restoring the natural sediment transport regime of Matilija Creek and the Ventura River, would be consistent with Coastal Act goals for habitat restoration and beach enhancement. The Commission further finds, to the extent the project's design has been completed, that the proposed project represents the least environmentally damaging feasible alternative. The Corps' commitments for habitat protection, monitoring and adaptive management, combined with its commitments to conduct a phased review and to continue to coordinate the evolving mitigation measures with (and report the monitoring results to) the Commission, enable the Commission to find the proposed project consistent with the environmentally sensitive habitat protection, marine resource, water quality, and wetlands policies (Sections 30230, 30231, 30232, 30233, and 30240) of the Coastal Act.

B. <u>Sand Supply</u>. Sections 30233(b) and (d) of the Coastal Act provides:

(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.

(d) Erosion control and flood control facilities constructed on watercourses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.

The Matilija Creek subwatershed supplies approximately 24% of the Ventura River's sediment load. The Corps notes: "In the last eighty years, sand supplies from the Ventura River watershed have been markedly reduced due to dam construction, watershed improvements, and riverbed sand and gravel mining." Based on information from the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON) (1989), the Corps estimates the Ventura River delivers 70% of its former natural yields of sand to the ocean. The Corps also estimates that without the dam removal, it would take about 100 years for sediment supply to the ocean from Matilija Creek to reach pre-dam conditions. With the project, only storms in excess of 10-yr. storms will reach finer grained sediments and transport them downstream. In addition, the soil

cement protection will reduce mobilization of fine sediments, and the Corps estimates conveyance of fines during the larger storm events to be within the range of natural fluctuations. The Corps also states:

> *During the staged removal of soil cement revetment (starting from the downstream end) to allow for the eventual complete erosion of the remaining protected sediment, it is estimated that turbidity levels could temporarily increase by a factor of 2 to 10 above baseline conditions. The duration and level of turbidity would depend on how much fine sediment is exposed to a given magnitude of flow event. During lower flow conditions, flows would remain in the active channel thereby limiting any access to the finer sediment (hence increased turbidity effects) along the unprotected portion of the bank. Following the final staged removal of the revetment, turbidity levels would be expected to stabilize to levels similar to the No Action Alternative after one or two average storm flow events pass through the reservoir basin. The staged removal of the revetment would be tied to a monitoring/adaptive management program designed to minimize impacts downstream.*

The Corps estimates that, with the project: "Under average hydrological conditions, … the riverine system could reach equilibrium conditions within 20 years." The Corps further estimates that the sediments behind the dam include approximately 1.7 million cu. yds. of beach compatible sand, and 2.7 million cu. yds. of material "…that would meet the minimum gradation requirements for beach placement (sands and gravels)." The sediments have been tested for contaminants, and as the watershed is fairly pristine and unaffected by human uses, the Corps concludes that the sediments are uncontaminated. Approximately 2.1 million cubic yards of sediment will be slurried to a designated downstream disposal site and deposited within several areas in proximity of the Highway 150 (Baldwin Road) Bridge (Exhibit 13). The thickness of this placement will vary by area and range between 10 and 25 feet. While the slurry operation is taking place, excavation operations will commence in the more upstream areas behind the dam to construct a channel with an alignment similar to the pre-dam channel. Approximately 1.1 million cubic yards of these sediment will be temporarily placed in several storage sites within the reservoir basin as shown in Exhibit 11. The Corps states:

> *Sediments within the original reservoir basin will be subject to natural erosion and transport downstream by stream flows. Selective segments of the channel within the lower half of the reservoir basin will be protected with soil cement revetment. The purpose of the revetment is to "meter" the erosion of the 'Delta Area' sediment whenever the revetment is overtopped by larger flows. The height of the revetment will extend 7 feet above the channel invert and 5 feet below the invert to prevent undermining of the structure. The revetment height will be overtopped by flows exceeding a 10- year storm event (12,500 ft^3/sec). At the upstream end of the soil cement revetment, a tie-in to the adjacent canyon slope or road embankment will be required to prevent circumventing of the structure by breakout channel flows. The tie-in*

may consist of either soil cement or larger boulders (collected from on-site). Coarser-grained materials within the reservoir basin located upstream of the revetment will remain unprotected and subject to natural erosion by stream flow.

Thus, the project has been designed to implement the Coastal Act "sand supply" policies in two ways: (1) through the removal of the sediment-capturing dam and thus restoring sediment flows to downcoast beaches, which have been experiencing serious erosion problems in recent decades; and (2) through strategically placement of the approximately 6 million cubic yards of sediment that have accumulated behind the dam since its construction, in a manner designed to allow natural storm conveyance to ultimately transported the sediments to the shoreline and help rebuild eroding beaches. The Commission therefore finds the proposed project consistent with the sand supply policies of Sections 30253(b) and (d) of the Coastal Act.

C. <u>Public Access and Recreation</u>. The Coastal Act provides for the maximization and protection of public access and recreation opportunities and for the protection and recognition of the economic, commercial, and recreational importance of fishing activities:

Section 30210. *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

Section 30214*. (a) The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case ….*

Section 30220*. The use of private lands suitable for visitor-serving commercial recreational facilities designed to enhance public opportunities for coastal recreation shall have priority over private residential, general industrial, or general commercial development, but not over agriculture or coastal-dependent industry.*

Section 30223*. Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible.*

Section 30234*. Facilities serving the commercial fishing and recreational boating industries shall be protected and, where feasible, upgraded. Existing commercial fishing and recreational boating harbor space shall not be reduced unless the demand for those facilities no longer exists or adequate substitute space has been provided. Proposed recreational boating facilities shall, where feasible, be designed and located in such a fashion as not to interfere with the needs of the commercial fishing industry.*

> ***Section 30234.5.*** *The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.*

The project's two primary emphases, restoration of steelhead habitat and restoration of sediment supply to downcoast beaches, would both be consistent with the letter and intent of these Coastal Act policies. The Corps states:

> *The entire Matilija Canyon lies within the Los Padres National Forest, although there are extensive non-Federal in-holdings as well, totaling over 2,245 acres, including the 442-acre Ventura County Watershed Protection District Matilija Reservoir site. Additionally, Matilija Canyon habitats support a number of federally listed species of animals that are sensitive to human activities, including recreational activities. Therefore, private interests and environmental resources have been important considerations in developing a recreation plan in conjunction with the Recommended Plan.*
>
> *Matilija Canyon has been a favorite destination for outdoor enthusiasts since the 1865, and a favorite haunt of trout fishers since the establishment of a private resort near the mouth of Matilija Canyon in 1872. The construction of Matilija Dam, and the VCWPD operation of the once-private Matilija Hot Springs, altered the nature and intensity of recreational use of this popular canyon within the Los Padres National Forest. Removing Matilija Dam and restoring the reservoir site and downstream reaches of Matilija Creek and the Ventura River has the potential to provide opportunities for regional open space/recreation network connectivity. There are many opportunities to integrate the project site into a broader, regional network of open space, recreational and educational amenities, providing links between existing trail systems from the Los Padres National Forest to trails near the Ventura River.*

In addition, the Corps has incorporated a number of construction-related measures to further minimize temporary access and recreation impacts from the dam removal activities. These measures include defining limited staging areas, marked and guarded to ensure public safety, and located to avoid noise impacts to sensitive receptors, advance notice by mail to all residents and property owners, published notice of the impending construction in local newspapers, identification of a public liaison, and implementation of noise reduction devices where appropriate. The Corps concludes:

> *Implementation of the proposed project is not anticipated to have any significant adverse effects on recreational resources on the lower reaches of the Ventura River or the ocean shoreline in the vicinity of the Ventura River estuary. Over time, it is expected that a pattern of erosion and deposition along the mainstem of the river, at the river delta, and along nearby ocean beaches will return to a more natural, pre-dam condition. The deposition of sediment is not expected to have a dramatic impact on the Ventura River or the estuary, although portions of Matilija Creek near the dam may*

experience substantial topographical changes from erosion/deposition of sediment. As more sediment is allowed to migrate down river and eventually enter the littoral zone of the ocean, it could result in more deposition of sand onto local beaches and contribute to increased beach width over time, which would benefit the recreational resources associated with the coastal beaches (e. g., beach-going activities).

The Commission agrees and finds that the project will benefit coastal public access and recreation by enhancing recreational fishing throughout the Ventura River and its tributaries and by improving sediment supply to downcoast beaches. The Commission therefore concludes that the proposed project is consistent with the public access and recreation (Sections 30210-30214 and 30220-30222) and the recreational fishing (Sections 30234 and 30234.5) policies of the Coastal Act.

D. Geologic Hazards. Section 30253 of the Coastal Act provides (in part) that new development shall:

(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

The Corps states:

The process of returning the river to pre-dam conditions will increase the flooding risk to infrastructure that has developed along the river corridor since the construction of the dam. The Recommended Plan includes features to mitigate the induced flood risk including removal of structures, replacement of a bridge, and raising and extending downstream levees and floodwalls.

The Corps further states:

Justification for Mitigation of Downstream Damages

Flood mitigation measures to protect against structural damages include construction of levees/floodwalls (new, or raising/extending existing structures) and bridge modifications. Where protection is not possible, due to engineering, social, legal, or economical reasons, land must be acquired. Mitigation for occasional damages to croplands, beyond without-project conditions, will also require compensation. Table 4-1 summarizes the mitigation.

The primary mitigation measures for flood protection (listed on Exhibit 24) are purchasing properties that cannot be protected, adding levees at Meiner's Oak and Live Oak (Exhibits 16-20), increasing the levee height at Casitas Springs, and modifying or replacing downstream bridges (Camino Cielo and Santa Ana Bridges (Exhibit 22)). With the mitigation measures incorporated into the plan, the project will avoid exacerbating downstream flooding. While these mitigation measures have not been fully designed, and as noted by NOAA Fisheries (see Appendix A, Letter #1) may need further engineering analysis to fully justify, the Corps' agreement for adaptive management, combined with its commitments to conduct a phased review and to continue to coordinate the evolving mitigation measures with (and report the monitoring results to) the Commission, enable the Commission to find the proposed project would "minimize risks to life and property" in an area of high flood hazard are and thus be consistent with the geologic hazard policy Section 30253(a) of the Coastal Act. Moreover, through enhancing downstream beach building, the project would lessen the need for construction of shoreline protective devices and be consistent with the goal articulated in Section 30253(b) of the Coastal Act that encourages reducing the need for "construction of protective devices that would substantially alter natural landforms along bluffs and cliffs."

E. <u>Water Supply</u> Section 30254 of the Coastal Act provides:

> *New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.*

The project has the potential to both beneficially and adversely affect important regional water supplies which serve coastal development, including high priority development under the Coastal Act as defined in Section 30254 above. Potential adverse effects include: (1) sediments in water flows could inhibit existing water diversion operations; (2) sediment deposition in the flood plain, as well as the construction of levees, could reduce groundwater recharge; (3) turbidity transferred to the Lake Casitas reservoir could affect available water supplies and could reduce water storage capacity in the reservoir; (4) water quality could be affected by increased contaminants delivered to the water supply; and (5) downstream water diversions at Foster Park could be inhibited. To minimize sedimentation impacts to Robles Diversion and Lake Casitas facilities, the Corps has included in the project a sediment bypass structure and a sediment desilting basin. To reduce water supply impacts the Corps proposes the construction of two wells at Foster Park to reduce impacts to City of Ventura facilities. In

addition, the water quality mitigation measures as summarized on page 21 above would help protect area water supplies.

With the mitigation measures, the project will avoid adverse effects on regional water supplies. The Corps also notes that it may be able to improve available water supplies, as well as improve fish passage, with further design refinements. While the mitigation measures have not been fully designed at this time, the Corps' agreement for adaptive management, combined with its commitments to conduct a phased review and to continue to coordinate the evolving mitigation measures with (and report the monitoring results to) the Commission, enable the Commission to find that the proposed project would assure that the availability of existing or planned public works facilities needed to serve coastal dependent and other high priority land uses as defined in Section 30254 will not be precluded by the proposed project. The Commission therefore concludes that the proposed project would be consistent with the water supply policy (Section 30254) of the Coastal Act.

F. <u>Archaeological Resources</u>. Section 30244 of the Coastal Act provides:

Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

The Corps states:

The identification of cultural resources in the project's area of potential effects (APE) has not been completed. The potential exists for the presence of National Register eligible properties within the project's APE. Until the identification phase is completed, and National Register evaluations are performed on any sites present, an impact assessment of the preferred alternative cannot be made. However, if National Register eligible properties are present, they may be avoidable through implementation of the following mitigation measures:

If any sites are determined to be eligible for the National Register of Historic Places, mitigation measures shall be developed and agreed to in a memorandum of agreement. This document would be developed between the California State Historic Preservation Officer, the Corps and local sponsors. Federally Recognized Tribes and interested Native American groups would be invited to participate as concurring parties to the agreement. These procedures shall follow the requirements of Section 106 of the National Historic preservation Act, as implemented by 36 CFR 800.

A discovery plan shall be developed in consultation with the State Historic Preservation Officer pursuant to 36 CFR 800.13(b) to treat previously unknown resources found during implementation of the project. It shall include procedures to

monitor and treat cultural resources discovered during mechanical and natural removal of sediment behind Matilija Dam. It would a so include procedures for discoveries made during grading and earth moving activities.

With the coordination described above, the Commission finds that the project will avoid, and where appropriate, mitigate impacts to archaeological or paleontological resources as identified by the State Historic Preservation Officer, and that the project is therefore consistent with Section 30244 of the Coastal Act.

IV. SUBSTANTIVE FILE DOCUMENTS:

1. EIS/EIR, Matilija Dam Ecosystem Restoration Feasibility Study, U.S. Army Corps of Engineers, July 2004.

2. Assessment of Steelhead Habitat in Upper Matilija Creek Basin, Ventura County Flood Control District, Thomas R. Payne and Associates, June 9, 2003.

3. Assessment of Steelhead Habitat in the Ventura River/Matilija Creek Basin, Ventura County Flood Control District, Thomas R. Payne and Associates, August 30, 2004.

APPENDIX A – CORRESPONDENCE – attached

1. Letter from NOAA Fisheries to Corps of Engineers, 8/31/04.
2. Letter from Southern California Steelhead Coalition to CCC, 9/20/04.
3. Letter from Surfrider Foundation (Ventura Co. Chapter) to CCC, 8/31/04.
4. Letter from Surfrider Foundation (Ventura Co. Chapter) to Corps of Engineers, 8/30/04.
5. Letter from Endangered Habitats League to CCC, 9/6/04.
6. Letter from City of San Buenaventura to CCC, 9/9/04.
7. Letter from California Trout to CCC, 9/7/04.

EXHIBITS – attached

1-4. Region/Watershed Maps
5-7. Dam and Reservoir
8-15. Project Elements
16-21. Flood Mitigation
22. Santa Ana Bridge Replacement
23. Robles Diversion Dam
24. Mitigation Measures
25. Adaptive Management Plan